

REMARKS / ARGUMENTS

Claims 35-48 and 56-89 remain pending in this application. No claims have been canceled or added.

Interview

Applicant wishes to thank the Examiner for conducting an interview with the undersigned and Applicant's representative on September 6, 2006. While a supplemental response was being prepared, the Examiner issued a new Office Action. Therefore, this response will consider both the new Office Action and the discussion during the interview.

35 U.S.C. §112

Each of the Examiner's rejections under this section will be discussed in the order they are presented in the Office Action.

Examiner's comment (1): "The specification does not disclose a single physical input/output port which is coupled to the Internet. Figures 1, 4, 5, 7 and 8 disclose eight (8) ports and Figures 6 and 13 disclose four (4) ports."

Applicant's response: The disclosure of the claimed "a physical input/output port" is clearly shown in Figs. 6 and 13. These figures show four Ethernet ports 56

which are common for block data and file data. Therefore, any of these ports can be accessed by both a block I/O request and a file I/O request having different port numbers (see U.S. 2002/0178143, [0147] and [0160]). It is not necessary for the Figures to show only one port.

Examiner's comment (2): "The specification does not disclose how to assign two different port numbers to a single physical input/output port."

Applicant's response: It is submitted that one of ordinary skill in the art can easily understand how different port numbers can be received at a single physical input/output port. Furthermore, the specification clearly states that the block data and file data input/output means processes the input/data packets according to Internet Protocol and determines whether the packets contain block data or file data based on the port number specified in the TCP packets encapsulated in the Internet Protocol compliant packets (see [0160]). Still further, Applicant wishes to point out to the Examiner that in Internet Protocol, the physical address of a port is different from the port number included in the packet. The port number is used to identify the process to which the packet is to be forwarded once it has arrived at the storage system. Therefore, packets can be received at a single physical input/output port, which is connected to an IP network, and contain different port numbers.

The Internet Assigned Numbers Authority (IANA) is responsible for assigning TCP and UDP port numbers to specific uses. The port numbers are divided into

three ranges: the Well Known Ports, the Registered Ports, and the Dynamic and/or Private Ports (See http://en.wikipedia.org/wiki/TCP_and_UDP_port_numbers).

The Examiner further comments that [0160] of Applicant's specification does not recite a first port number and a second port number. However, the specification clearly states that the block data and file data input/output means determines whether the packets contain block data or file data based upon the port number specified in the TCP packets encapsulated in the Internet Protocol compliant packets. Therefore, one of ordinary skill in the art can easily understand that a first port number indicates the presence of block data while the second port number indicates the presence of file data.

Examiner's comment (3): "The specification does not disclose the difference between file-based I/O blocks and block-based I/O blocks. It is particularly unclear from the specification what comprises blocks which are not associated with file-based I/O blocks. Are these block-based I/O blocks single stand-alone blocks since they appear not to be associated with a larger entity such as a file, document or application program?"

Applicant's response: Once again, it is submitted that one of ordinary skill in the art would understand exactly the difference between file-based I/O blocks and block-based I/O blocks. As clearly stated in the specification, applications that run on servers handle file-basis data, whereas storage systems connected to a SAN, typically a disk array, operate for block-basis data input and output (see [0009]).

Thus, when data input/output between a server and a storage system is performed, a file system on the server translates file-basis data to block-basis data that is input via the SAN to the storage and vice versa (see [0010]). The specification also defines a network attached storage (NAS) which has a file system within the storage system and file-basis data input/output is performed between a server and the NAS. The file system within the NAS translates file-basis data to block-basis data that is stored on a hard disk drive.

Examiner's comment (4): "The specification does not disclose how internet traffic is divided into two categories, i.e., block-based and file-based." Furthermore, the Examiner maintains that files are transmitted in blocks (packets) over the Internet and thus are essentially block-based. Therefore, the difference, if indeed any, between file-based I/O blocks and block-based I/O blocks is not clear from the specification.

Applicant's response: Once again, Applicant wishes to point out that one of ordinary skill in the art clearly understands the difference between file-based I/O, such as that performed by applications that run on servers; and block-based I/O, such as storage systems connected to a SAN or for hard disk drives of a NAS. Furthermore, the specification clearly discloses the difference between file-based I/O and block-based I/O in paragraphs [0009], [0010], [0012].

With respect to the Examiner's objection to claim 35, the objected to language has been removed from that claim. The same has been done for claims 42 and 56.

35 U.S.C. §103

Claims 35-48 and 56-59 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Barrera et al (U.S. Patent No. 6,748,448) in view of Gunlock (U.S. Patent No. 6,606,630) and further in view of Han et al (U.S. Patent No. 5,991,542). These rejections are traversed as follows.

As admitted by the Examiner, Barrera et al fail to disclose a physical input/output port being accessible by a block I/O request having a first port number via the IP network and a file I/O request having a second port number via the IP network. The Examiner relies upon Gunlock to cure this deficiency.

Gunlock discloses that a program references files in a storage by passing a command block to an operating system. The operating system passes block I/O requests derived from the command block to an appropriate driver. A device driver typically converts the block I/O request into a sequence of one or more device level commands. Once the drive attempts to execute each command, it returns to the operating system a response having status information, and other information possibly including data read from storage (see column 2, lines 13-32). Reference is repeatedly made to a Fibre Channel network, which processes block I/O requests.

Therefore, Gunlock does not disclose any physical input/output port being accessible by a block I/O request having a first port number via an IP network and a

file I/O request having a second port number via the IP network. Therefore, Gunlock fails to cure the deficiencies in the primary reference to Barerra et al.

Applicant also wishes to point out that Han et al do not disclose partitioning a storage volume into block volumes and file contents volumes as suggested by the Examiner. Han et al merely disclose an organization of logical blocks in a storage volume having boot blocks, a volume bit map and contents of files stored in the volume (see column 4, lines 49-60 and Figure 2). Therefore, the attempted combination of references fail to disclose or suggest the presently claimed invention.

Finally, although the patent to White (U.S. Patent No. 6,002669) is not explicitly mentioned as a basis for rejection on page 4 of the Office Action, it nonetheless appears to be relied upon throughout the Office Action. Therefore, the patent to White will now be discussed. White discloses a completely new type of protocol to deal with a specific situation of communicating with sensory and control devices with limited intelligence and processing resources (see column 1, lines 60-61). White provides his new protocol since existing protocols such as Internet Protocol "provide no capability for intermingling lower speed devices with higher speed devices on the same channel" and "use overly complex packet messaging formats" (see column 1, lines 54-57 and column 2, lines 47-48). Therefore, White teaches against the use of Internet Protocol.

The present invention is directed to the use of Internet Protocol in which a single physical input/output port can receive file-based I/O as well as block-based I/O. To further clarify the present invention, some of the claims specifically recite that

the block-based I/O is based on a SCSI protocol. Indeed, White only discloses the use of binary data and transmission of binary files. Therefore, one of ordinary skill in the art would not be motivated to combine the completely new protocol suggested by White in order to modify Barrera et al so as to provide a system in which file-based I/O and block-based I/O are received at a single physical input/output port for processing based upon the port number contained in the I/O request that is received.

The Examiner is hereby invited to contact the undersigned with any questions in order to expedite prosecution of this application.

Conclusion

In view of the foregoing, Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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